



George C. Marshall Space Flight Center  
(MSFC)  
EMI Test Facility  
(METF)  
Capability Briefing



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## Personnel

MSFC EMI  
Test Facility (METF)

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- METF Lead Engineer: Glenn Shelby
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- METF Lead Technician: Steven Linthicum
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  - phone: 256.544.5312



## Test Standards Experience

MSFC EMI  
Test Facility (METF)

- METF can test to all versions of MIL-STD-461 (A through E)
- Current NASA standards based mainly on MIL-STD-461C and 461E
- Test Standards routinely testing in METF
  - Military (MIL-STD-461)
  - Space Shuttle (SL-E-0002)
  - Space Station (SSP30237/30238)
  - SpaceLab (MSFC-SPEC-521B)
  - NASA EXPRESS Rack



# Facility Description

**MSFC EMI  
Test Facility (METF)**

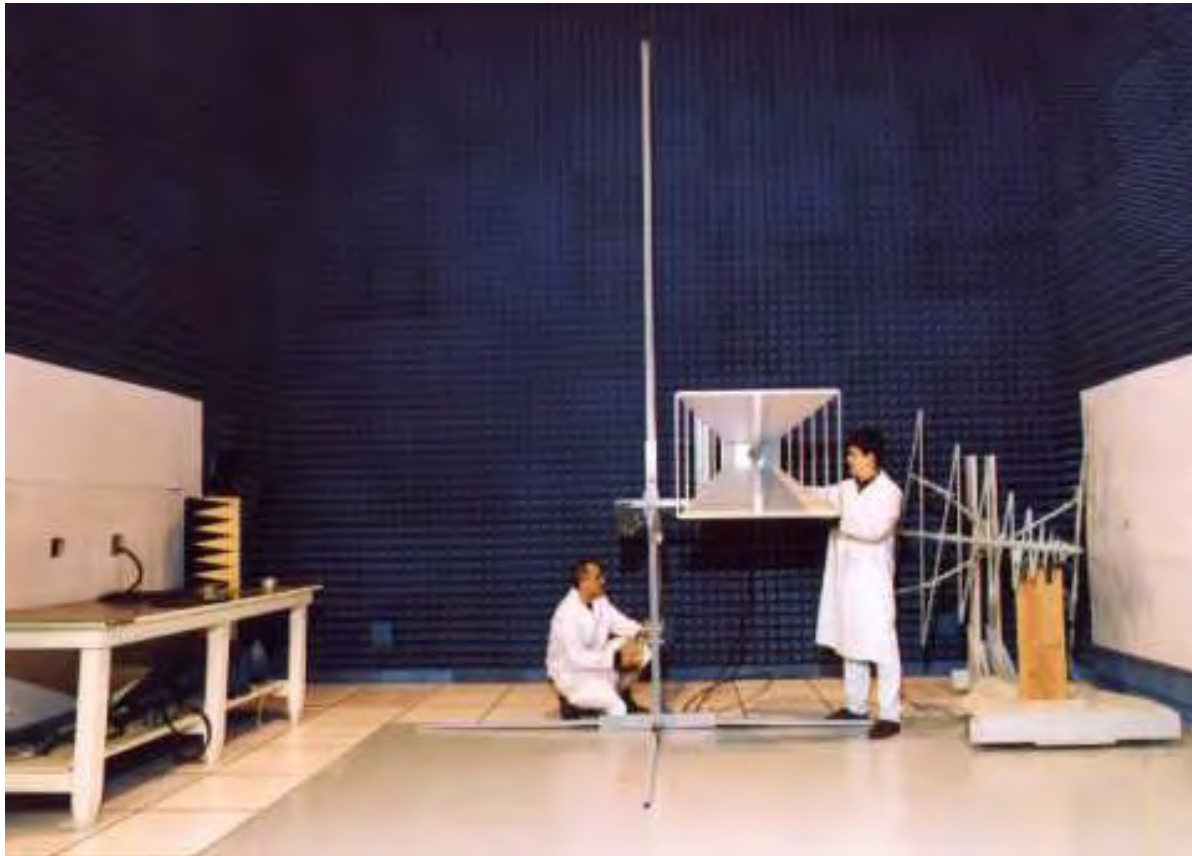
<b>Metric</b>	<b>Small Chamber</b>	<b>Large Chamber</b>	<b>Portable Tent*</b>
Size of test chamber	28ft (L) x 20ft (W) x 14ft (H)	28ft (L) x 24ft (W) x 20ft (H)	16ft (L) x 16ft (W) x 16ft (H)
Max size of test article	5'11" (W) x 6'11"(H)	6'8"(W) x 9'3" (H)	13ft (L) x 13ft (W) x 13ft (H)
Max weight of test article	1000 lb.	5000 lb.	Depends on installation location
Test table size	8ft (L) x 3ft (W)	12ft (L) x 6 ft (W)	8ft (L) x 3ft (W)
Absorber attenuation	3.5dB@80MHz increasing to 6dB@98MHz, then to 10dB@134MHz, >10dB in 134MHz-30GHz range	3.5dB@80MHz increasing to 6dB@98MHz, then to 10dB@134MHz, >10dB in 134MHz-30GHz range	Depends on installation configuration
Unique Instrumentation	Rohde&Schwarz ESI-26 EMI Receivers, HP8566B Spectrum Analyzers		
DC Power Supply	330V/100A and 40V/70A, max current 50A (limited by wiring/breaker size)		
Owner/Sponsor	NASA MSFC		
Cleanliness, Contamination Control	300k	300k	Depends on installation location
Size of access doors	5'11"(W) x 6'11" (H)	6'11"(W) x 13'4" (H)	Personnel door: 3ft (W) x 6ft (H)
Operational Costs	Typically \$3k/day, which includes engineering and technician support as well as calibration costs		
Availability/priority/scheduling	Schedules tailored to accommodate customer needs, typically 1-2 month lead time		
Personnel Certification	National Association of Radio and Telecommunications Engineers (NARTE) Certified EMC Engineer		

\* Portable tent can be expanded to accommodate larger volumes based on customer need



# METF Test Chambers

MSFC EMI  
Test Facility (METF)



- Double-wall welded steel enclosures
- > 100dB E-field shielding effectiveness 10kHz-12GHz
- External ambients >10dB below test specification limit lines
- Double-seal pneumatic-operated doors



## In Situ EMI Testing with Portable Tent

MSFC EMI  
Test Facility (METF)



The portable tent can be expanded to accommodate larger volumes based on customer need



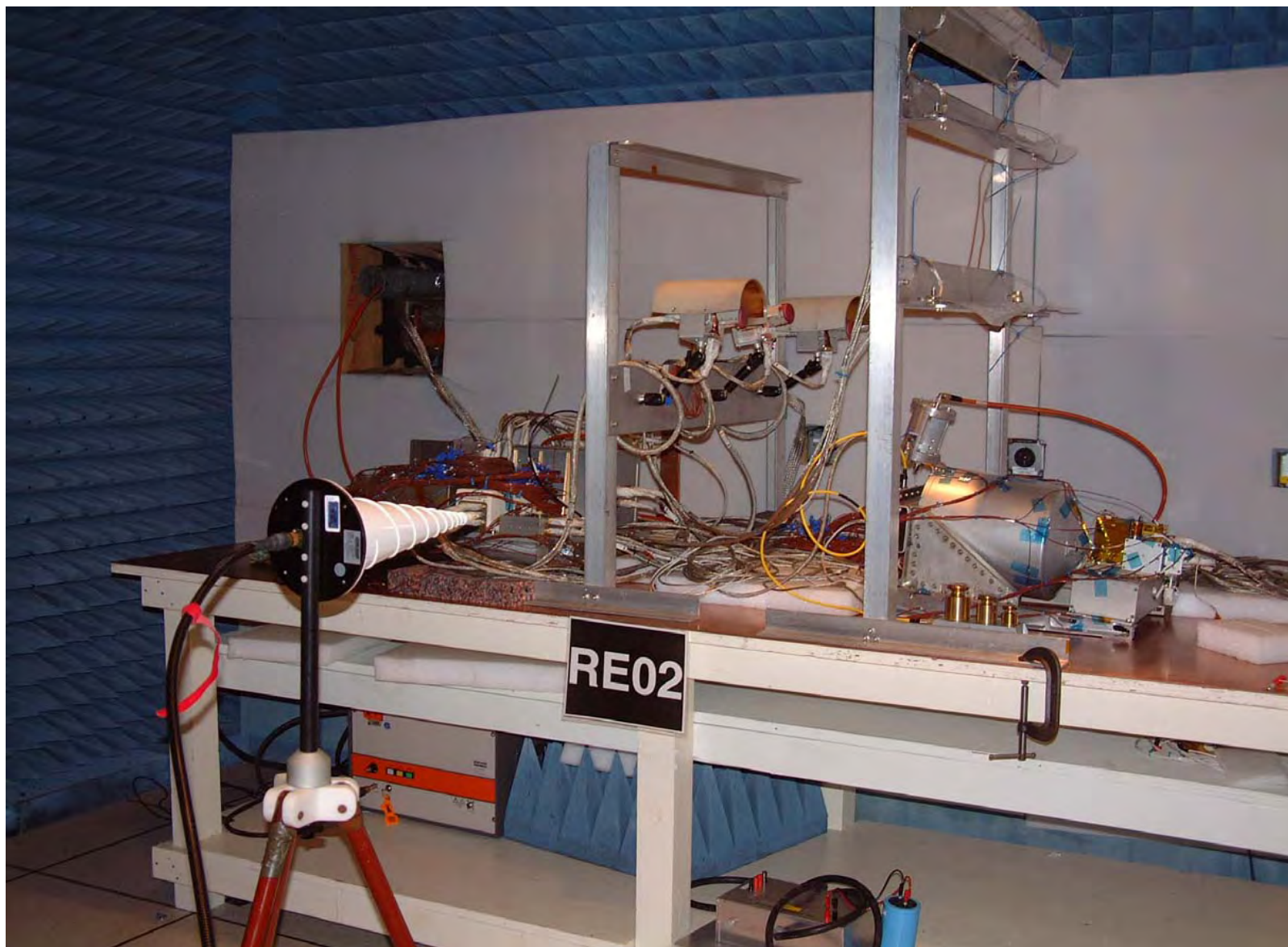
## Examples of EMI Tests





# NASA ProSEDS

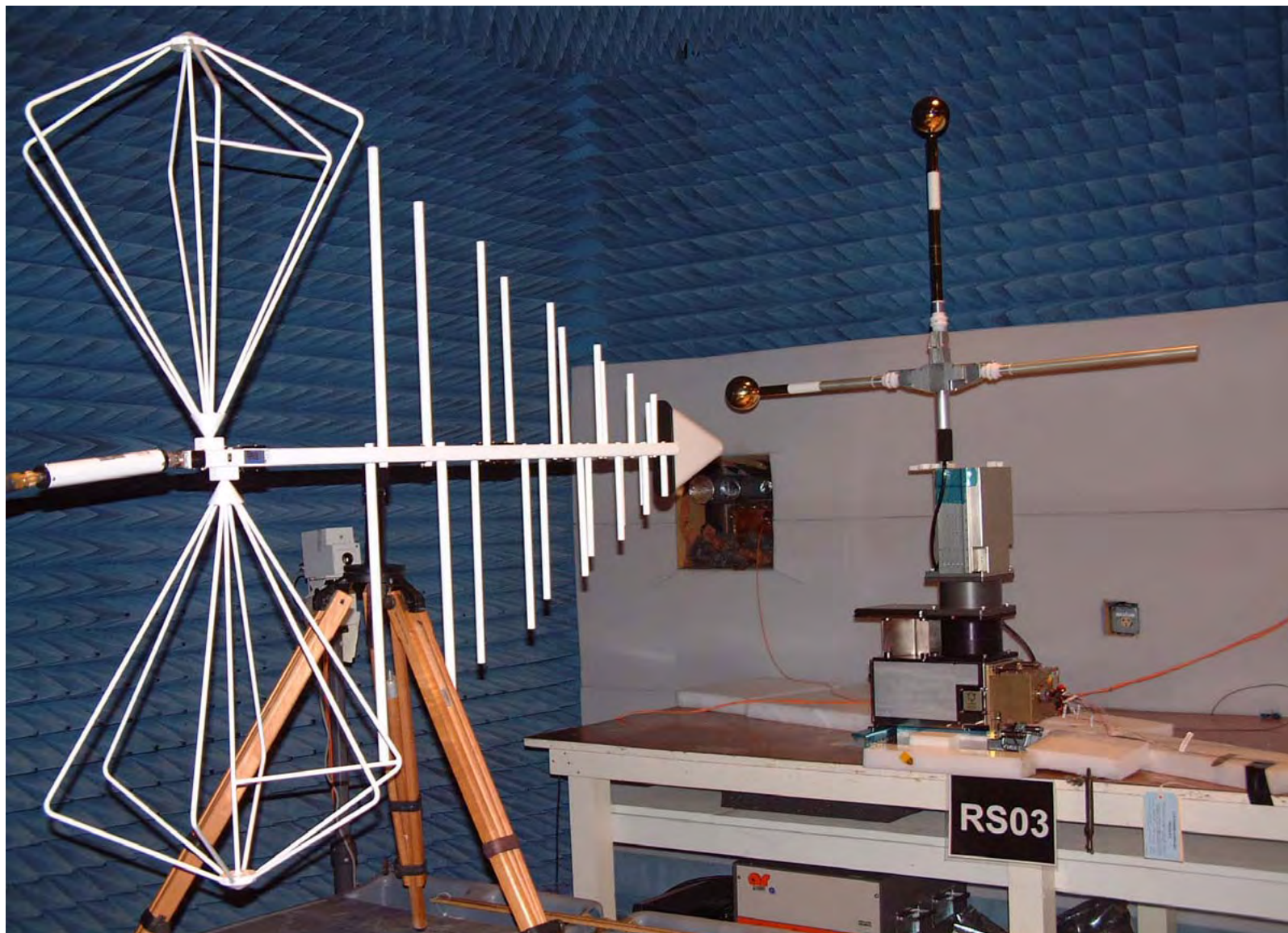
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# NASA Floating Potential Measurement Unit (FPMU)

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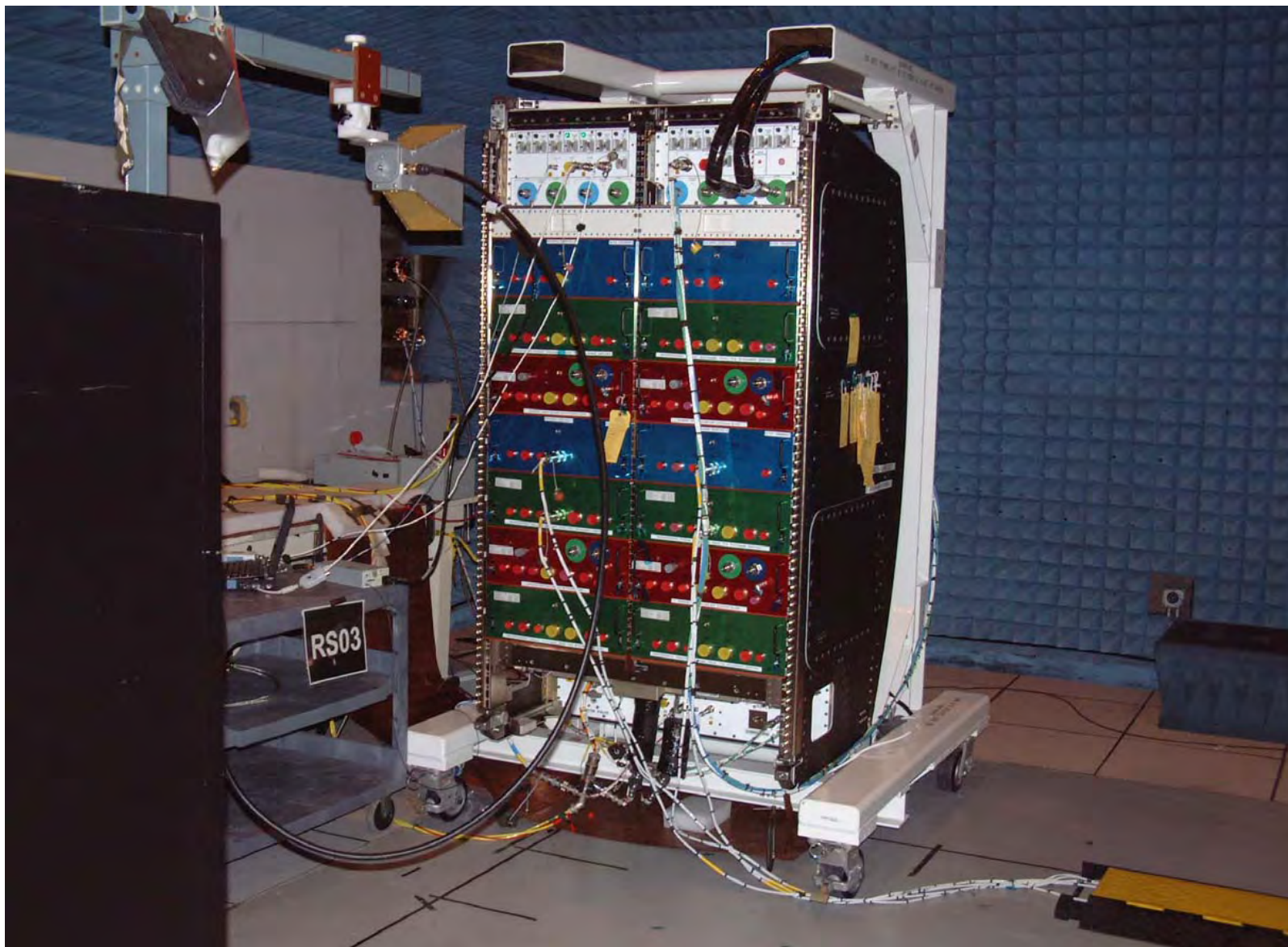






# NASA Habitat Holding Rack (HHR)

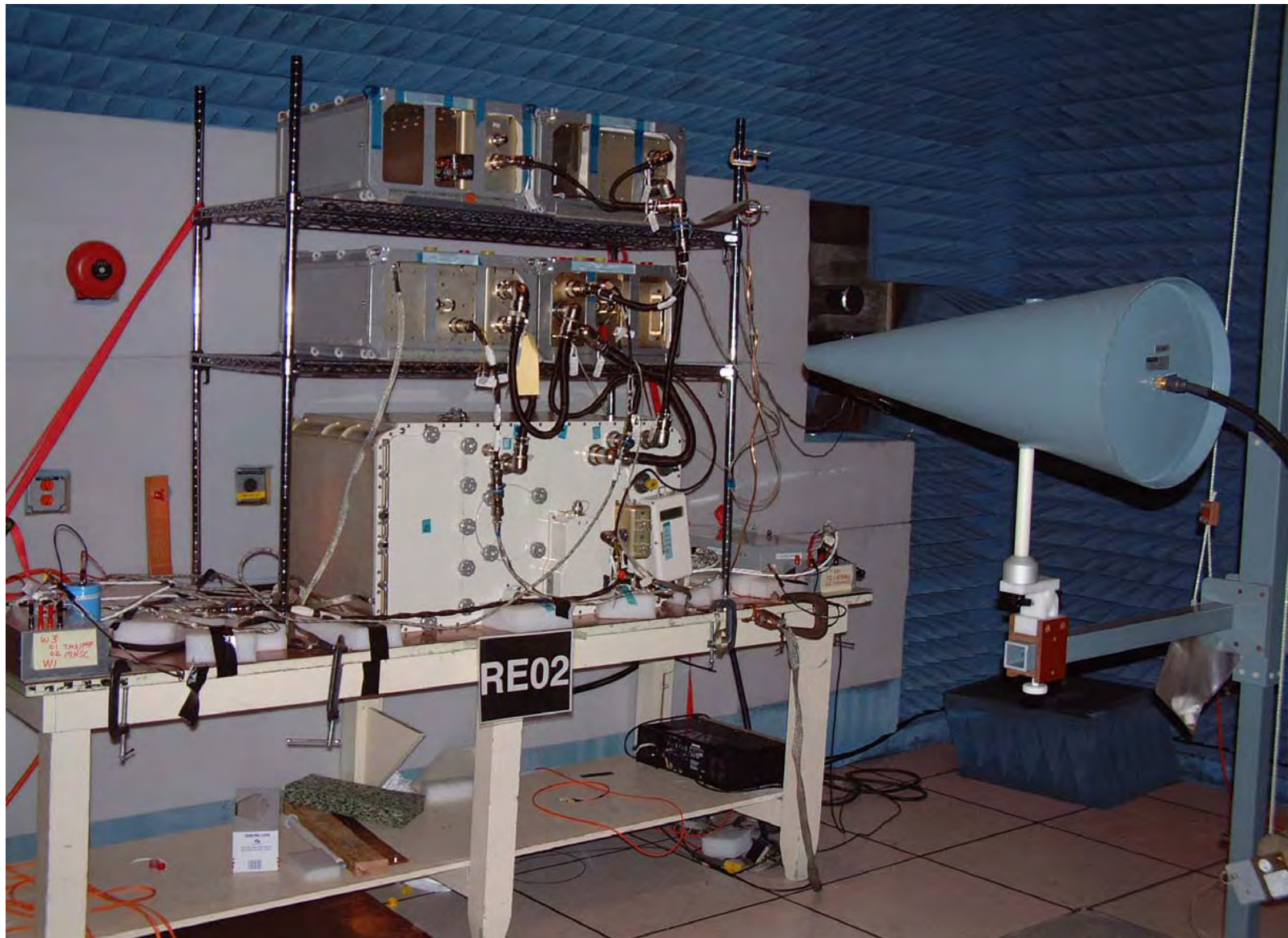
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# NASA Space DRUMS

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# NASA Advanced Astroculture

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## Army ICE Box

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## Business Topics

MSFC EMI  
Test Facility (METF)

- Main contract vehicle is a Simplified Space Act Agreement (SSAA)
- Funding transfers with Department of Defense (DoD) via MIPR
- Contract flow
  - Customer contacts METF for initial discussions
  - Customer completes METF test questionnaire to aid in test planning/cost estimation
  - METF provides cost estimate to customer
  - METF initiates SSAA
  - NASA works and finalizes SSAA
  - Customer signs SSAA
  - Customer transfers funding to NASA
  - Testing begins



# Test Planning Capability

MSFC EMI  
Test Facility (METF)

- Extensive test planning capability
- Test standards are silent on some critical setup issues
- METF personnel can aid test planning at other test facilities





## Benefits of testing at METF

MSFC EMI  
Test Facility (METF)

- Staff
  - Two National Association of Radio and Telecommunications Engineers (NARTE) certified EMC Engineers on staff
  - All testing is either conducted by or closely supervised by a senior level NARTE-certified EMC engineer
  - Facility lead engineer has extensive experience with military EMI testing
- Test Environment
  - METF is a non-production test environment where the staff focuses all attention on the customer in the test chamber
  - If the test item fails a test, the test item stays in the chamber for troubleshooting (different than most commercial labs)



## Benefits of MSFC E3 Team

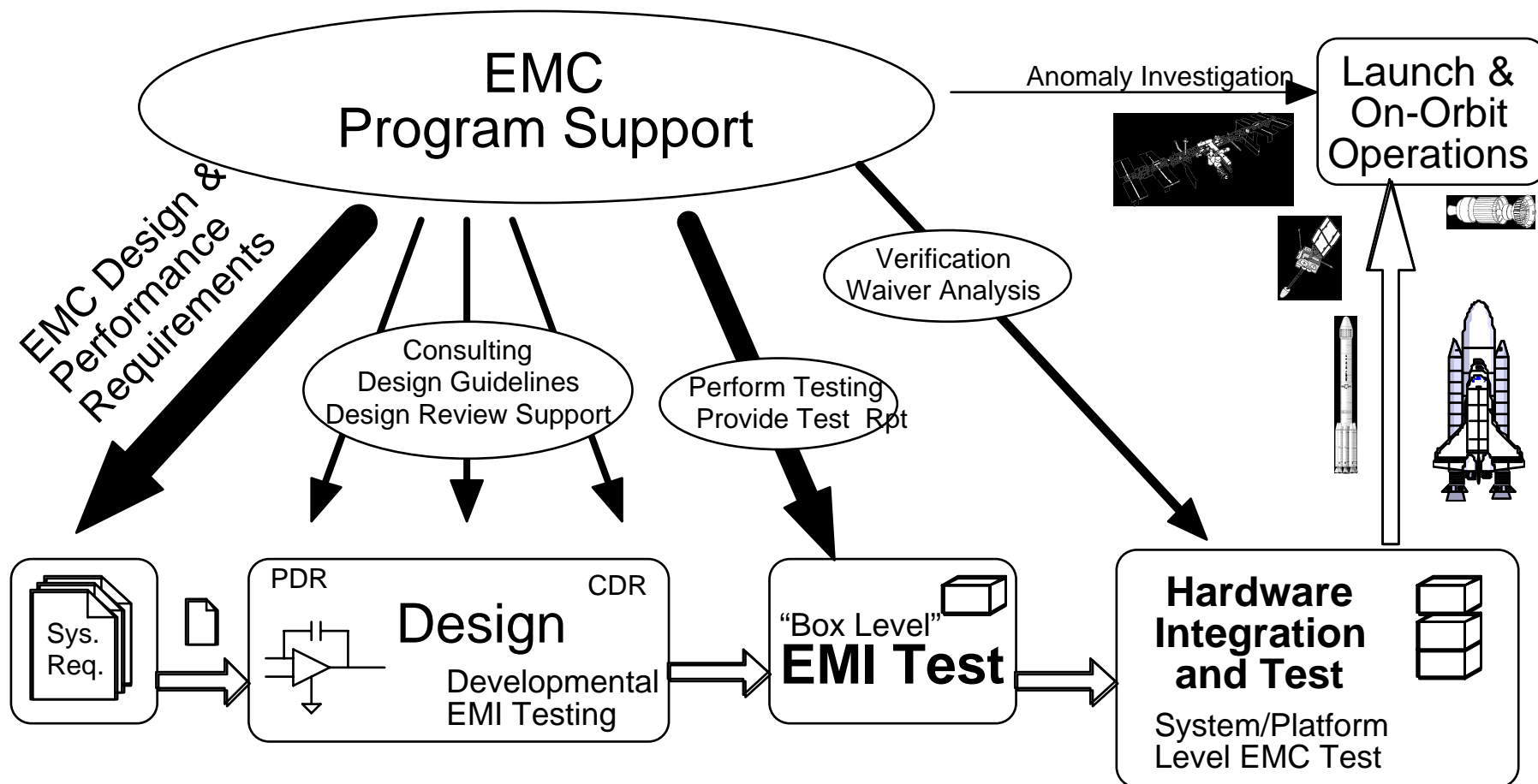
MSFC EMI  
Test Facility (METF)

- Requirements team has extensive experience with requirements definition, test data verification and waiver submittal for NASA programs
- E3 Team is involved in the MIL-STD-461F update
- METF is being utilized for development testing for MIL-STD-461F update



# E3 Team supports all phases of EMC program

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Test Facility (METF)





## Classified Capability

MSFC EMI  
Test Facility (METF)

- Currently five E3 team members hold a SECRET security clearance
- Classified processing capability has not been implemented in METF due to the low number of requests for classified work
- If the the test hardware is not classified, non-classified electronic data can be collected with existing computers and provided to the customer for integration into a classified report



## General Topics

MSFC EMI  
Test Facility (METF)

- MSFC Quality Assurance (QA) coverage of EMI testing can be provided
- Test Reporting Options:
  - Data only
  - Quick Look summary
  - Full test report with analysis



## Contact Information

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